

AHWAHNEE BRIDGE

Yosemite National Park Roads and Bridges
Spanning Merced River on service road
Yosemite National Park
Mariposa County
California

HAER NO. CA-100

HAER
CAL
22-YOSEM,
21-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service
U.S. Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

HISTORIC AMERICAN ENGINEERING RECORD

AHWAHNEE BRIDGE
(Kenneyville Bridge No. 1)
Yosemite National Park
HAER No. CA-100

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I. INTRODUCTION

Location:

Ahwahnee Bridge carries a limited-access road across the Merced River in the east end of Yosemite Valley, Yosemite National Park, Mariposa County, California. The structure is one of two spans located approximately 1/4-mile south of the Ahwahnee Hotel on the Mirror Lake access road.

QUAD: EL CAPITAN, CA
UTM: 11/273380/4180350

Date of Construction:

1927-1928

Designer and Builder:

Designed by George D. Whittle, Senior Highway Engineer for the San Francisco district office of the Bureau of Public Roads.

Contractors: Rocca and Caletti

Original and Present Owner

Yosemite National Park, National Park Service.

Structure Type:

Stone-faced reinforced concrete filled spandrel arch bridge

FHWA Structure No.:

8800-OD6P

Present Use:

Park road bridge.

Significance:

The only-triple arched masonry bridge in Yosemite Valley, the Ahwahnee Bridge is characteristic of the National Park Service's "rustic style" of architecture.

Project Information:

This document was prepared as part of the Yosemite Roads and Bridges Recording Project, conducted by the Historic American Engineering Record in summer 1991.

Richard H. Quin, HAER Historian

II. HISTORY

This is one in a series of reports prepared for the Yosemite Roads and Bridges Recording Project. HAER No. CA-117, YOSEMITE NATIONAL PARK ROADS AND BRIDGES, contains an overview history of the park roads.

HISTORY OF AHWAHNEE BRIDGE

Ahwahnee Bridge is a graceful three-arched bridge carrying the limited-access Mirror Lake Road across the Merced River in the upper end of Yosemite Valley. Like five other spans built under a Valley bridge replacement program, Ahwahnee Bridge is a stone-faced reinforced concrete structure; however, unlike the other bridges, the Ahwahnee Bridge is distinguished by its use of three separate arches, making for an especially picturesque example of the "rustic style" of architecture employed by the National Park Service during the 1920s and 1930s.

Construction of Ahwahnee Bridge and the neighboring Sugar Pine Bridge [HAER No. CA-99] enabled the National Park Service to reroute the old Mirror Lake Road southward in order to provide space for the opulent new Ahwahnee Hotel constructed at about the same time. The original road to Mirror Lake ran closer to the north wall of the Valley; part of this road was retained as a cul-de-sac to provide access to the new hotel. The new road ran east across Ahwahnee Meadow. Here, the Merced River made a northerly meander, requiring two new bridges.

Like the other Yosemite Valley bridges constructed in this period, Ahwahnee Bridge was designed by George D. Whittle, Senior Highway Engineer for San Francisco district office of the Bureau of Public Roads (United States Department of Agriculture). Under an agreement with the National Park Service in 1925, the Bureau of Public Roads assumed responsibility for design and construction of major park roads and road structures. Daniel R. Hull, chief of the NPS landscape engineering division, did not accept the original site chosen, but ordered the structure moved downstream about 150'.

Nathan W. Morgan, NPS Office Engineer, visited Yosemite in October 1925 to investigate the sites for the new bridges. In a letter to Thomas C. Vint of the NPS Landscape Engineering Division, he urged that either an 80' single span stone-faced arch bridge or a twin-span girder bridge be constructed.² After further review, a three-arch stone-faced bridge was selected. The final design was reviewed and approved by two members of the Washington-based National Commission on Fine Arts. The construction contract for the Ahwahnee and four other bridges was awarded to the San Francisco firm of Rocca and Caletti.³

The bridge was first called "Kenneyville Bridge No. 1," after the little establishment of "Kenneyville" where the Valley livery stables were located. (The nearby Sugar Pine Bridge was called "Kenneyville Bridge No. 2.") The

* After George Kenney, an 1870s Yosemite stage line operator, who joined with partner William T. Coffman in 1885 to operate a livery service in the Valley. James M. Hutchings had maintained stables on the site even earlier; these were acquired by Coffman in 1878. ("The Yosemite Travel--A Round Trip," *Mariposa Gazette*, 21 April 1877, 2; Homer W. Robinson, "History of Business Concessions in Yosemite," *Yosemite Nature Notes* XXVII (June 1948), 89; "Incorporated," *Mariposa Gazette*, 3 November 1877, 3; "Hite's Cove and Yosemite," *Mariposa Gazette*, 15 April 1876, 2.)

original name was used in park administrative documents describing the bridge's construction. In October 1925, NPS Office Engineer Nathan W. Morgan suggested to NPS landscape architect Thomas C. Vint that Yosemite superintendent Washington B. Lewis or some other party be consulted to find more suitable names for the structure than "No. 1 or No. 2" (The name "Ahwahnee," meaning something like "Deep Grassy Valley," was ultimately chosen, probably on account of the simultaneous construction of the nearby Ahwahnee Hotel.)

Work began in winter 1926 with the construction of a work road between the two bridge sites. Actual bridge work began in July 1927 with excavation for the abutments and the placing of wooden falsework. Rocca and Caletti concentrated their crews on the project in August. The piers and abutments were completed in September, and in October the timber arch centering was placed and the three stone arch rings went up. Rocca and Caletti encountered trouble in finding competent stone masons at this point, and the work was slightly delayed.⁴

By the end of March 1928, the spandrel walls and west approach wing walls were up, and concrete was poured in April. A membrane waterproofing was placed in May prior to adding the fill, which came from the river bed just above the bridge site. All work was completed over the summer except for some pointing work and placing of the placing of riprap, and the bridge was accepted by the National Park Service in September.⁵

The area around the bridge was landscaped with native plants and willows in 1934 by enrollees in the Emergency Conservation Works program.⁶

In 1970, the National Park Service closed the eastern third of Yosemite Valley to private automobiles and instituted a shuttle bus system to provide alternate transportation. The Mirror Lake Road was closed at the same time closed to private vehicles, and today the Ahwahnee Bridge carries mainly walkers and cyclists bound for Mirror Lake.

Ahwahnee Bridge is 160' long and 41' wide; the width allows for two 13' 6" lanes of roadway, a 7' bridle path and a 5' sidewalk. (The width of the spandrel walls accounts for the remaining 3'.) The bridge is carried by three semi-elliptical arches. The central arch has a clear span of 42' and rises 7' from the springing line. The two side arches have 39' clear spans and rise 6'. The bridge abutments and the two piers are dug to firm foundations but do not rest on wooden piles as do several of the other bridges. Class "B" concrete was used for the abutments and the base of the piers; all other concrete work utilized Class "A" concrete."

The bridge is faced in native granite. The hand-cut arch ring stones or voussoirs were cut from templates and erected into the three arches on wooden falsework. The concrete barrel vaults were constructed next. The concrete was reinforced by deformed steel rebar (3/4" diameter longitudinal bars on 12" centers, and 1/2" diameter transverse bars on 18" centers, laid in two grids joined by 1/2" diameter metal hoops spaced alternately on 36" centers). Once the steel was in place, the concrete was poured in four stages. First, the abutments and piers were poured with Class "B" concrete. Next the crown sections of each arch were poured, followed by the haunch sections. The construction keys (located at the points where the arch haunches join the tops

* Classes of concrete refer to the amount of Portland cement used in the mixture, with Class "A" having the highest proportion and so on.

of the abutments or piers) were poured last. Tile weep holes were provided on 8' spacing in the masonry work. Once the concrete work was complete, a membrane waterproofing treatment was applied, and the compacted earth fill was added. Stone parapet walls, rising 3' 11" from the profile grade, were then constructed. A 20' pavement (done under a separate contract) was then laid atop the bridge. This pavement was separated from the bridle path and sidewalk by stone curbs. The walks were covered with 4" of stone screenings.⁷

The bridge, which carries only occasional service vehicles, is in good condition. However, concerns have been expressed that the bridge's piers are restricting the flow of the Merced River and contributing to seasonal flooding. For this reason, the park administration is now (1992) considering the replacement of the bridge. Ahwahnee Bridge is listed in the National Register of Historic Places.

III. ENDNOTES

1. Robert C. Pavlik, "In Harmony with the Landscape: A History of the Built Environment of the Yosemite National Park" (Master's Thesis, University of California at Santa Barbara, 1986), 47-48; W. K. Reed, Associate Engineer, National Park Service, to Bert H. Burrell, Acting Chief Civil Engineer, National Park Service, 17 September 1925, National Archives, Record Group 79, Entry 22, Box 20.
2. Nathan W. Morgan, NPS Office Engineer, Yosemite National Park, to Thomas C. Vint, NPS Landscape Engineering Division, San Francisco, 9 October 1925, National Archives, Record Group 79, Entry 22, Box 20.
3. Pavlik, 3.
4. Washington B. Lewis, Superintendent's Monthly Report, December 1925, 1; Acting Superintendent's Monthly Report, July 1927, 8; Acting Superintendent's Monthly Report, August 1927, 6; E. P. Leavitt, Acting Superintendent's Monthly Report, September 1927, 6; Acting Superintendent's Monthly Report, October 1927, 8; Acting Superintendent's Monthly Report, November 1927, 6.
5. Leavitt, Acting Superintendent's Monthly Report, March 1928, 5; Acting Superintendent's Monthly Report, April 1928, 4; E. C. Solinsky, Acting Superintendent's Monthly Report, May 1928, 5; Leavitt, Acting Superintendent's Monthly Report, June 1928, 4; Acting Superintendent's Monthly Report, July 1928, 4; Acting Superintendent's Monthly Report, September 1928, 3.
6. Charles Goff Thomson, Superintendent's Monthly Report, February 1934, 10.
7. Construction information taken in part from United States Department of Agriculture, Bureau of Public Roads, "Yosemite National Park, Plans for Five Bridges, Kenneyville Bridge No. 1 Across Merced River," construction drawing, December 1926. Measurements confirmed by HAER, July 1991.

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CONSTRUCTION DRAWINGS

United States Department of Agriculture, Bureau of Public Roads. "Yosemite National Park, Plans for Five Bridges, Kenneyville Bridge No. 1 Across Merced River." Construction drawing, December 1926.

SECONDARY SOURCE DOCUMENTS

Pavlik, Robert C. "In Harmony with the Landscape: A History of the Built Environment of the Yosemite National Park." (Master's Thesis, University of California at Santa Barbara, 1986).

Robinson, Homer W. "The History of Business Concessions in Yosemite National Park." Yosemite Nature Notes XXVII (June 1948).